

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | |

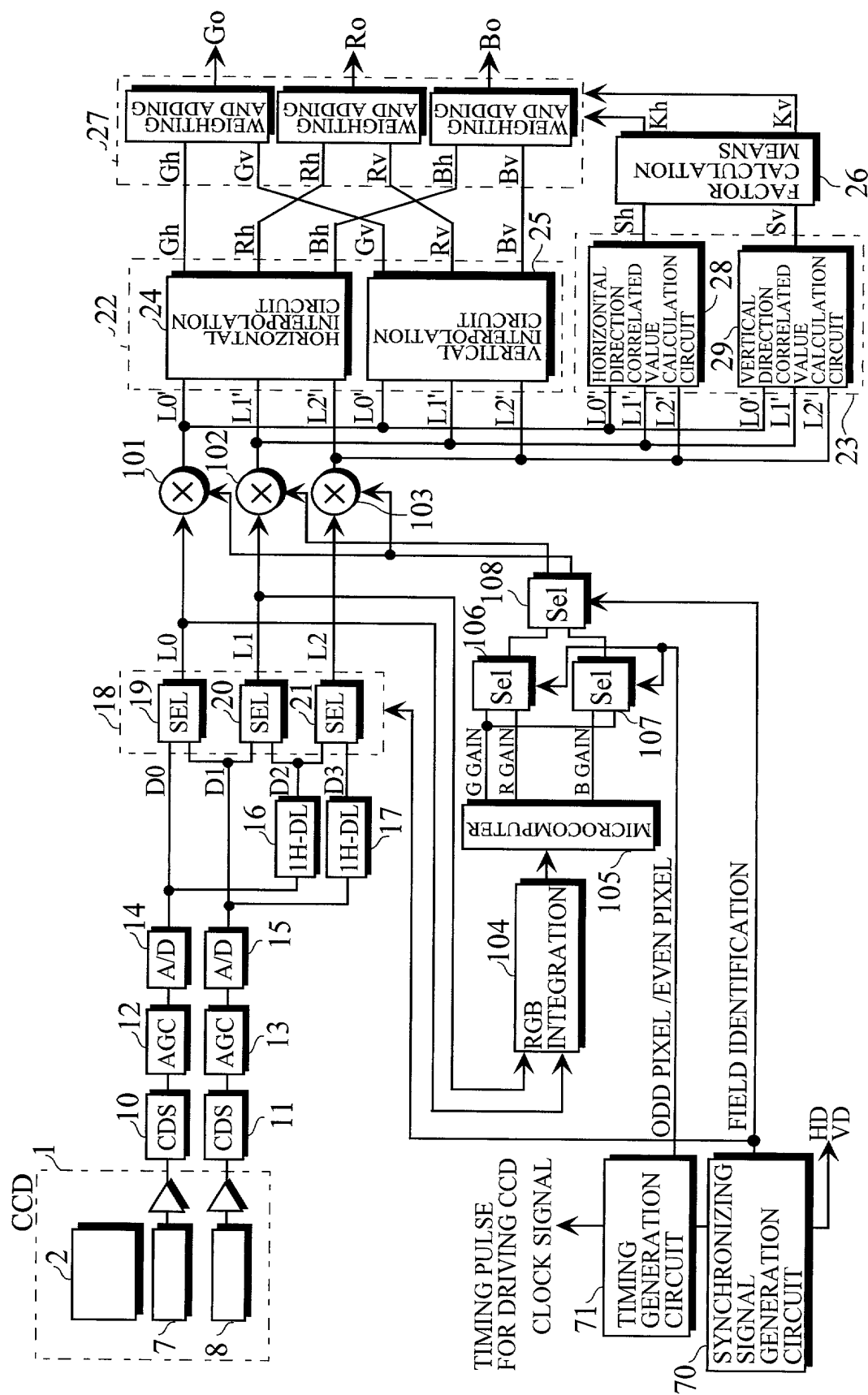


FIG. 2

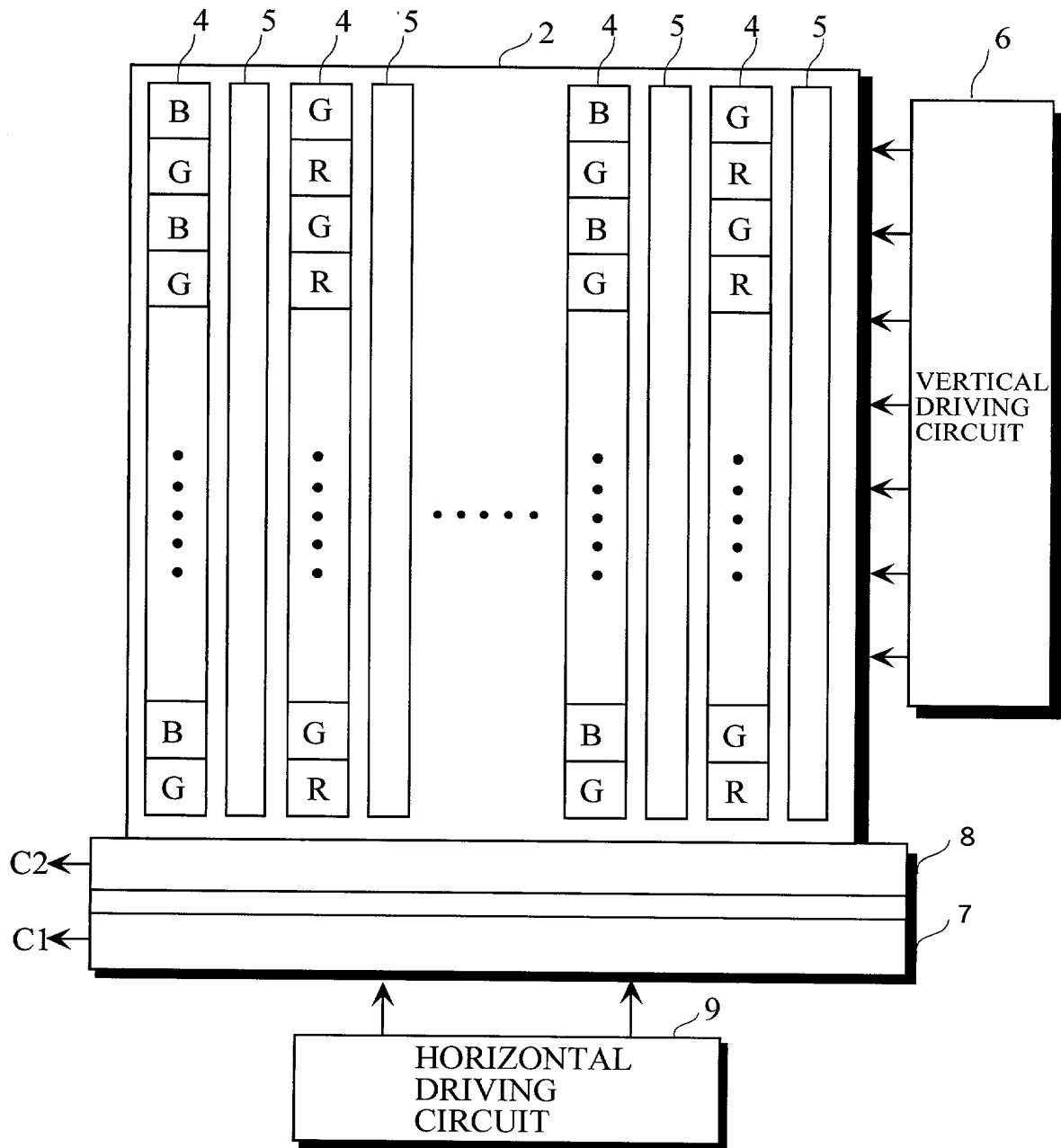


FIG. 3

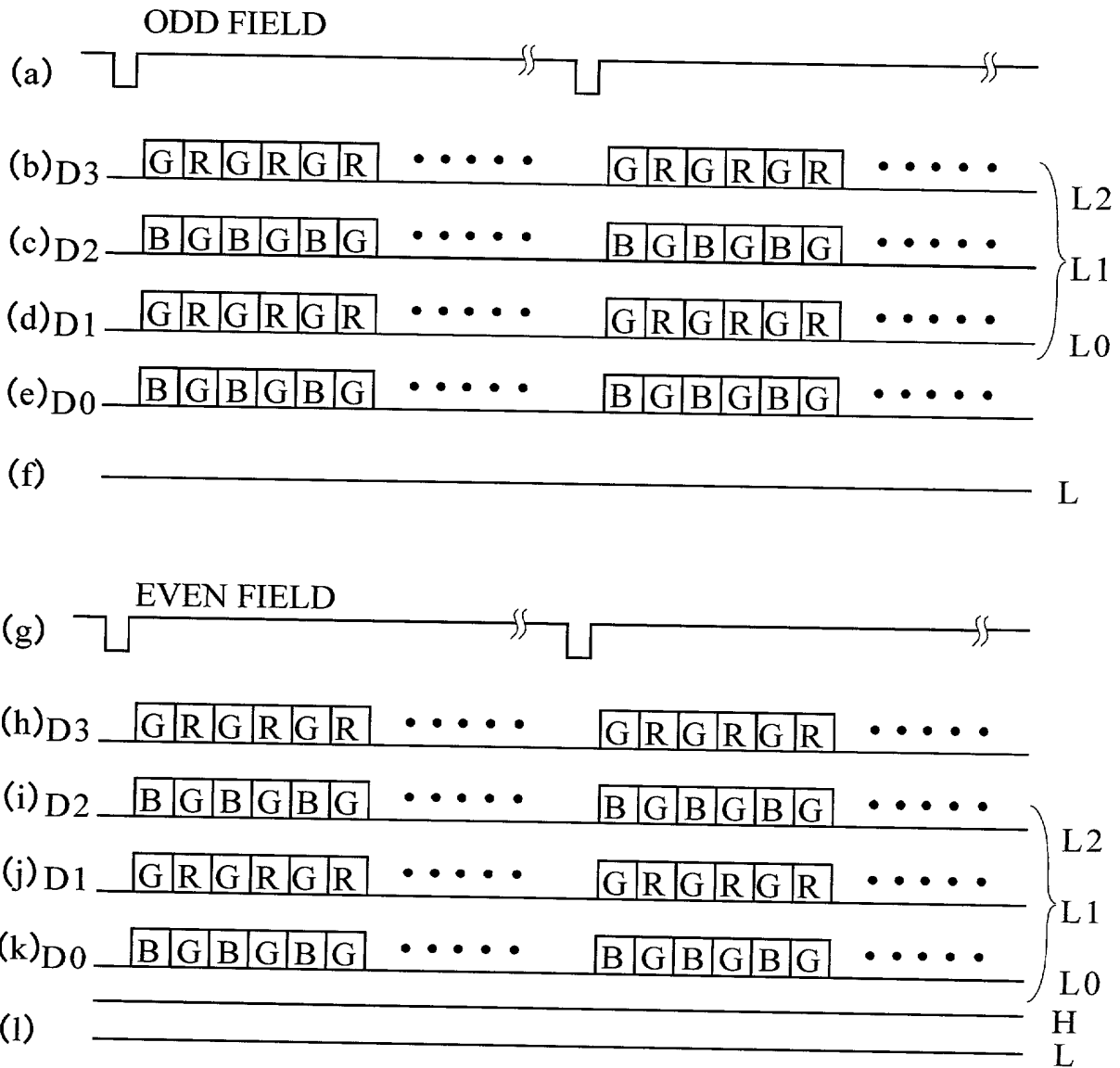


FIG. 4

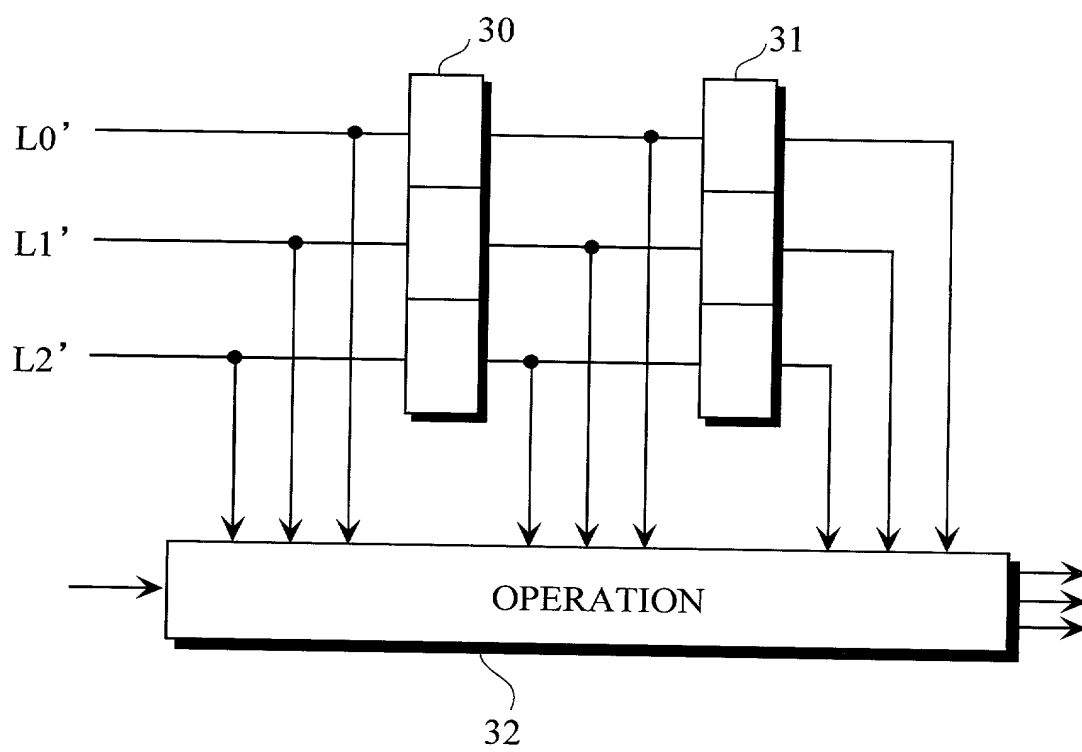


FIG. 6

| ODD FIELD | METHOD OF INTERPOLATING G, R, B SIGNAL | | | | | | | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|---|
| <p>ODD PIXEL</p> <table><tr><td>G11</td><td>R12</td><td>G13</td></tr><tr><td>B21</td><td>G22</td><td>B23</td></tr><tr><td>G31</td><td>R32</td><td>G33</td></tr></table> | G11 | R12 | G13 | B21 | G22 | B23 | G31 | R32 | G33 | $G_h = g_{22}$ $B_h = (b_{21} + b_{23}) / 2$ $R_h = \frac{g_{22} * r_{12}}{g_{12}} = \frac{2(g_{22} * r_{12})}{g_{11} + g_{13}}$ $G_v = g_{22}$ $R_v = (r_{12} + r_{32}) / 2$ $B_v = \frac{g_{22} * b_{21}}{g_{21}} = \frac{2(g_{22} * b_{21})}{g_{11} + g_{31}}$ |
| G11 | R12 | G13 | | | | | | | | |
| B21 | G22 | B23 | | | | | | | | |
| G31 | R32 | G33 | | | | | | | | |
| <p>EVEN PIXEL</p> <table><tr><td>R11</td><td>G12</td><td>R13</td></tr><tr><td>G21</td><td>B22</td><td>G23</td></tr><tr><td>R31</td><td>G32</td><td>R33</td></tr></table> | R11 | G12 | R13 | G21 | B22 | G23 | R31 | G32 | R33 | $B_h = b_{22}$ $G_h = (g_{21} + g_{23}) / 2$ $R_h = \frac{g_{22} * r_{12}}{g_{12}} = \frac{(g_{21} + g_{23})(r_{11} + r_{13})}{4g_{12}}$ $B_v = b_{22}$ $G_v = (g_{12} + g_{32}) / 2$ $R_v = \frac{r_{21} * g_{22}}{g_{21}} = \frac{(r_{11} + r_{31})(g_{12} + g_{32})}{4g_{21}}$ |
| R11 | G12 | R13 | | | | | | | | |
| G21 | B22 | G23 | | | | | | | | |
| R31 | G32 | R33 | | | | | | | | |

FIG. 7

| ODD/ EVEN FIELD | METHOD OF CALCULATING VERTICAL CORRELATED VALUE (Sv) AND HORIZONTAL CORRELATED VALUE (Sh) | | | | | | | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|--|
| <table><tr><td>D11</td><td>D12</td><td>D13</td></tr><tr><td>D21</td><td>D22</td><td>D23</td></tr><tr><td>D31</td><td>D32</td><td>D33</td></tr></table> | D11 | D12 | D13 | D21 | D22 | D23 | D31 | D32 | D33 | $S_v = (d_{11} + 2 \times d_{12} + d_{13}) - (d_{21} + 2 \times d_{22} + d_{23}) $ $+ (d_{21} + 2 \times d_{22} + d_{23}) - (d_{31} + 2 \times d_{32} + d_{33}) $ $S_h = (d_{11} + 2 \times d_{21} + d_{31}) - (d_{12} + 2 \times d_{22} + d_{32}) $ $+ (d_{12} + 2 \times d_{22} + d_{32}) - (d_{13} + 2 \times d_{23} + d_{33}) $ |
| D11 | D12 | D13 | | | | | | | | |
| D21 | D22 | D23 | | | | | | | | |
| D31 | D32 | D33 | | | | | | | | |

FIG. 8

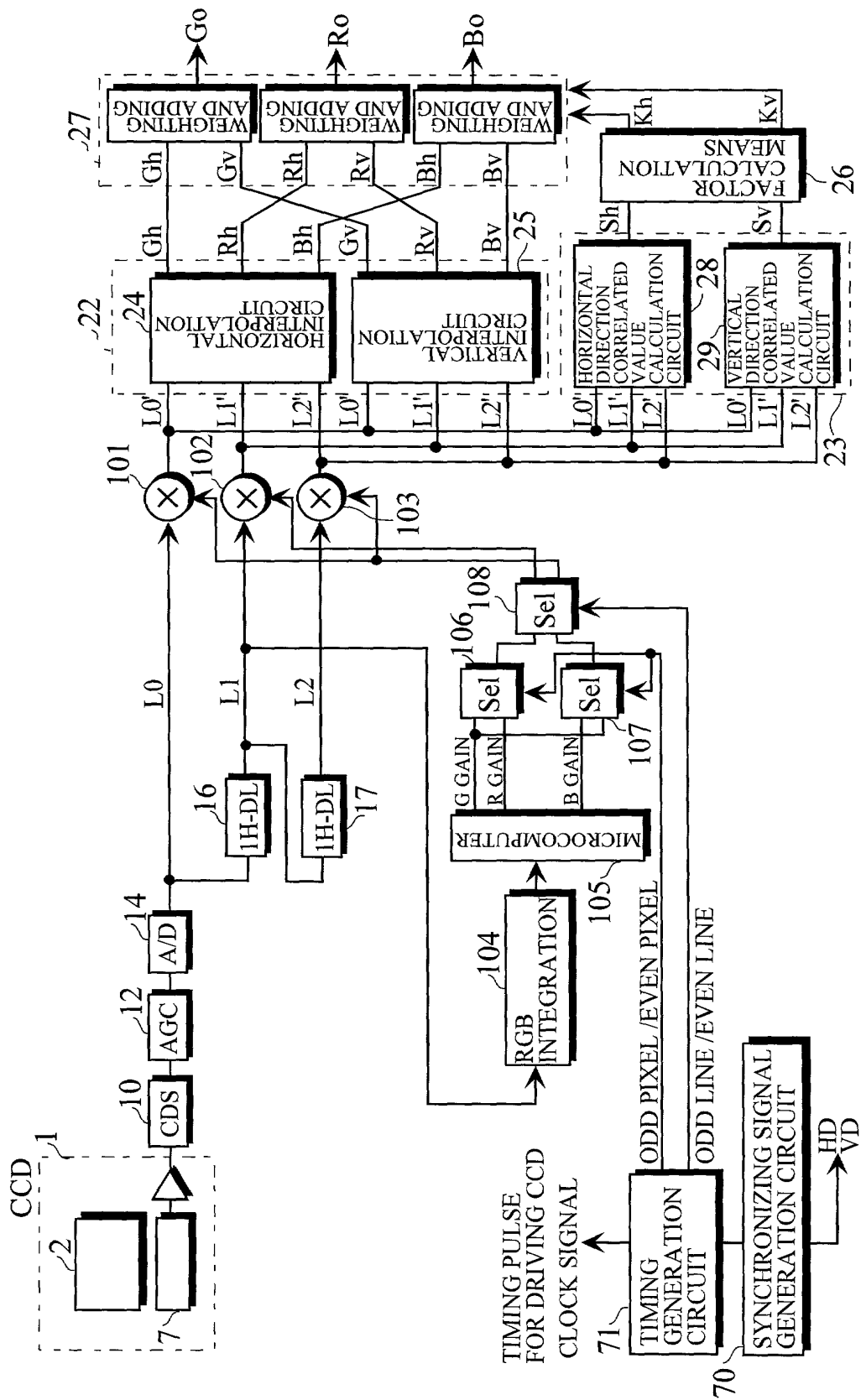


FIG. 10

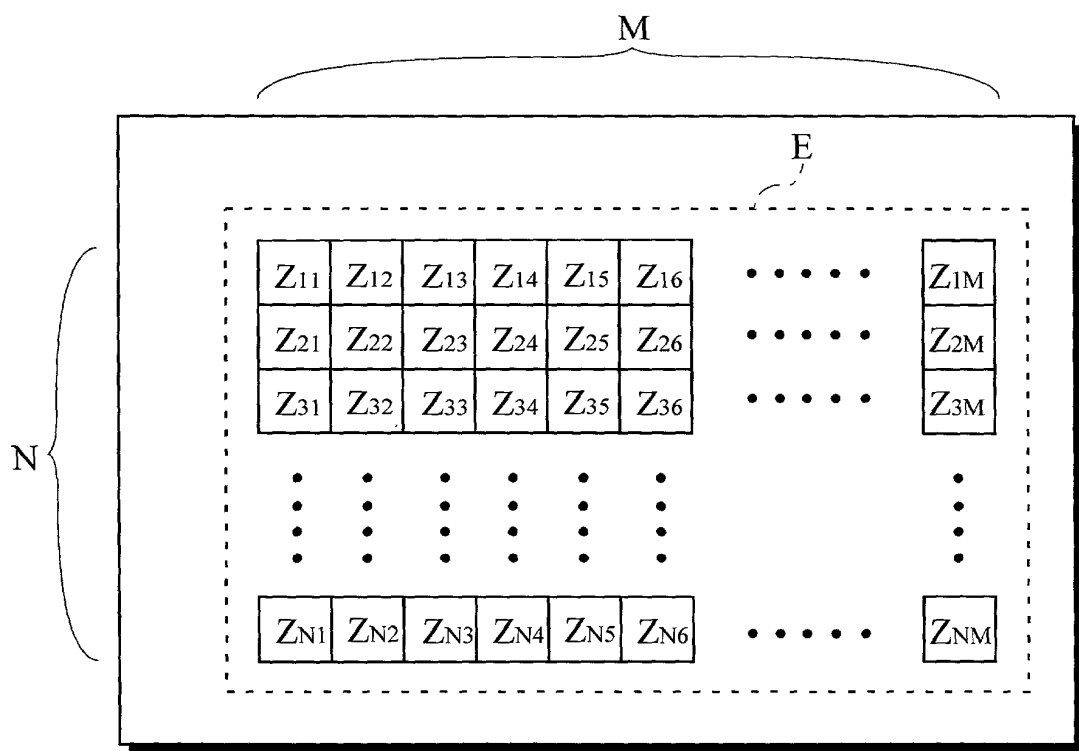


FIG. 11

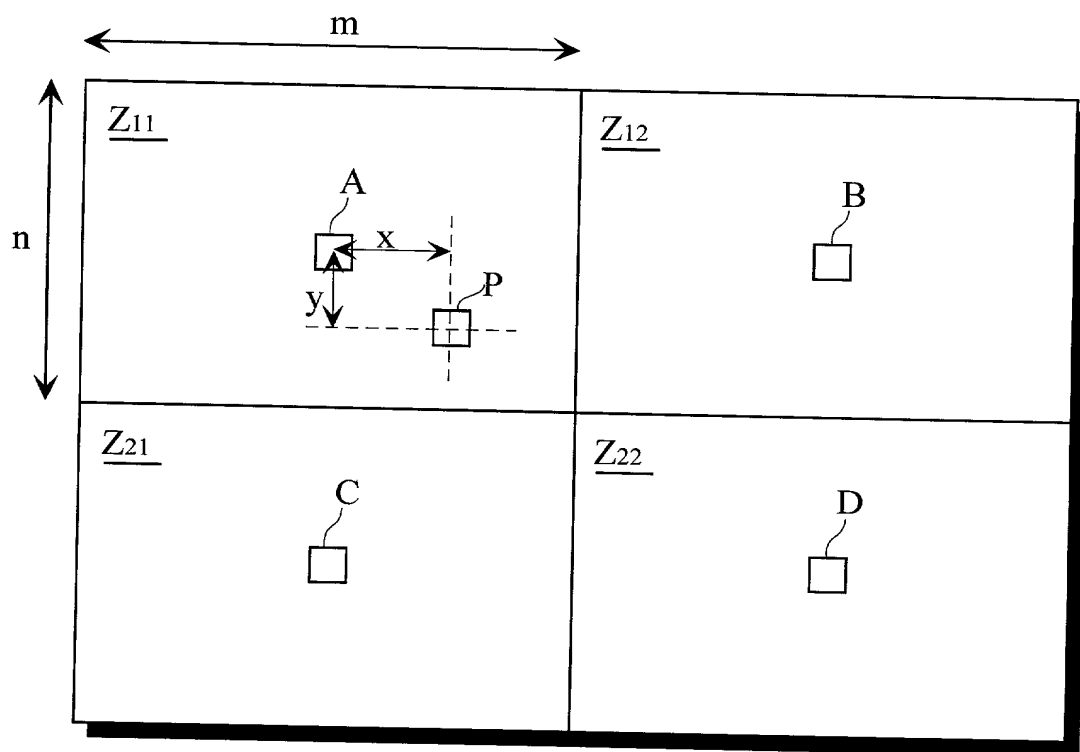


FIG. 12

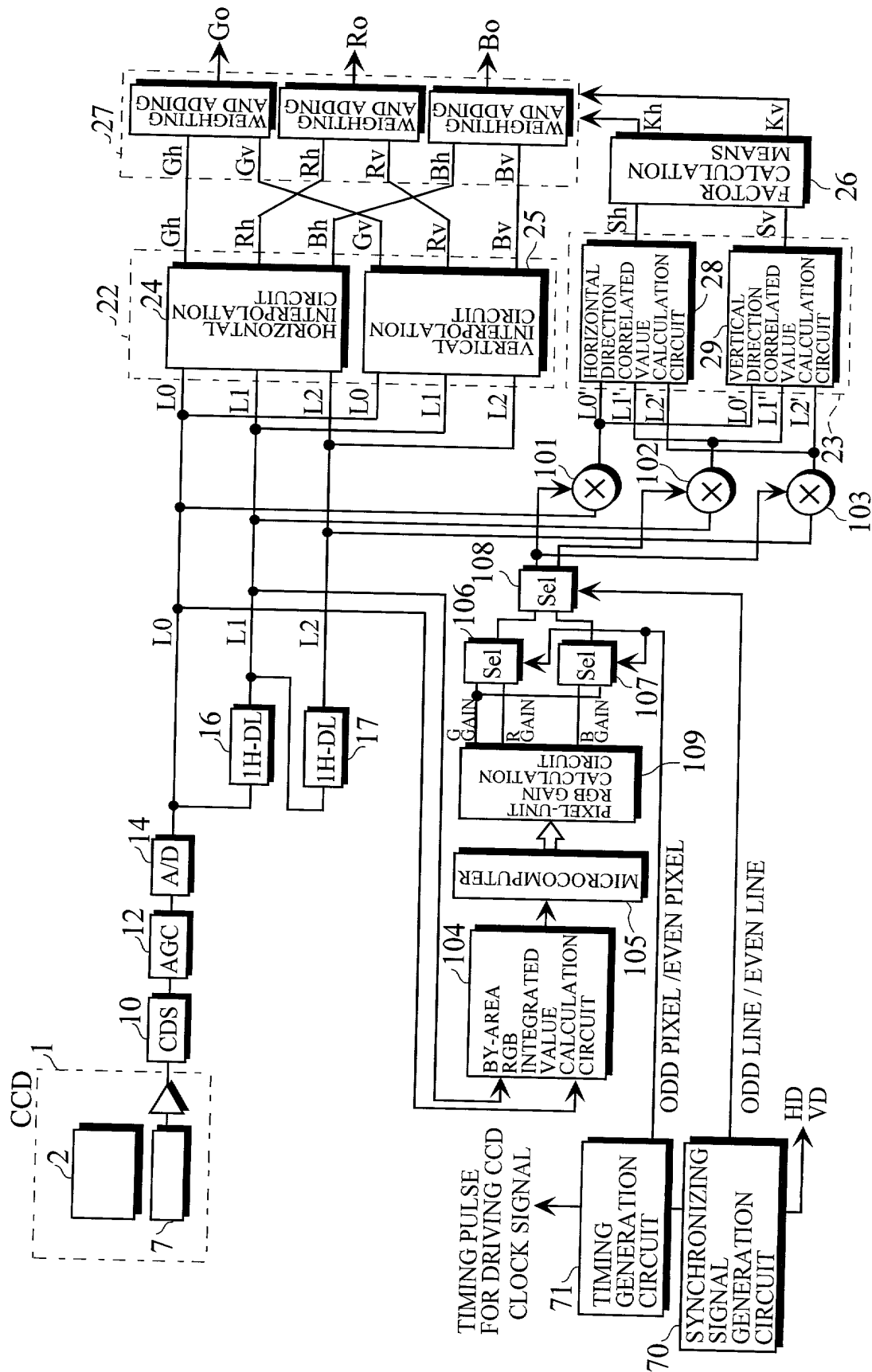


FIG. 13

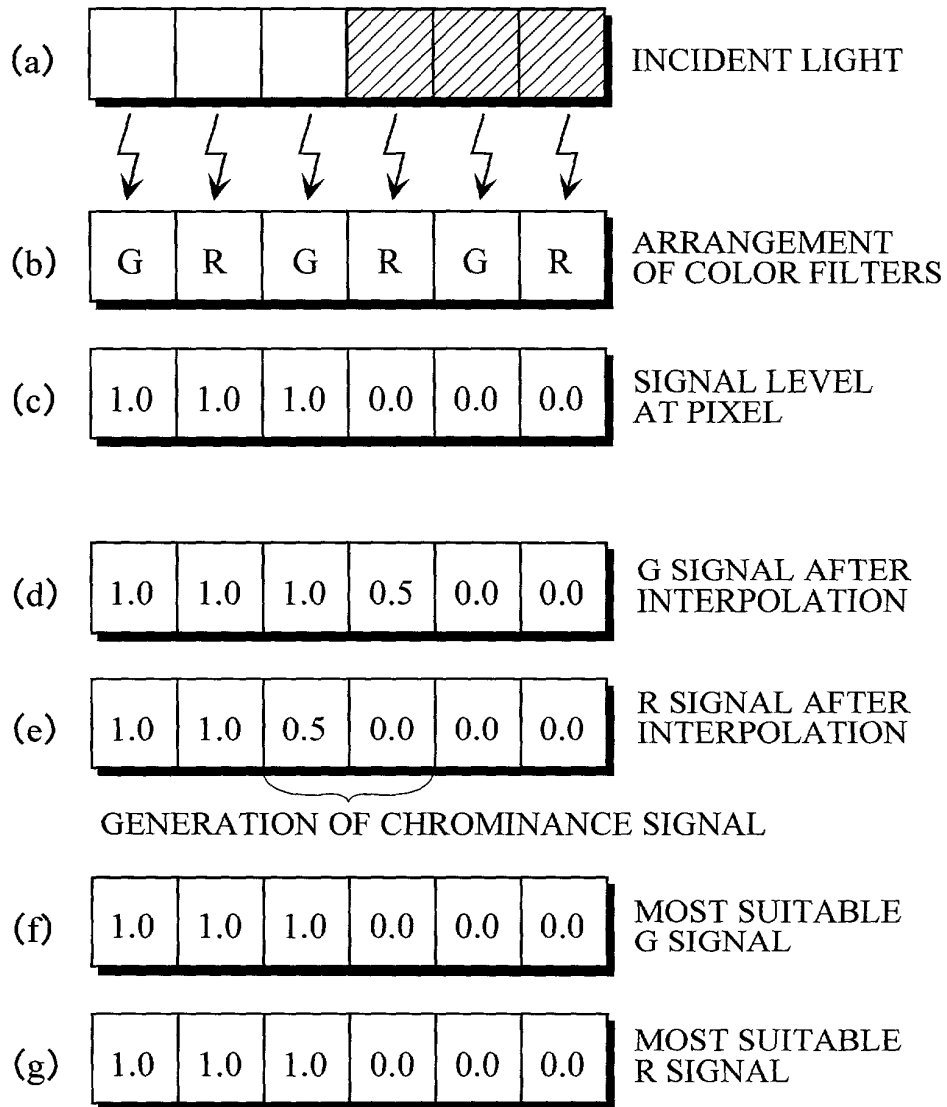


FIG. 14

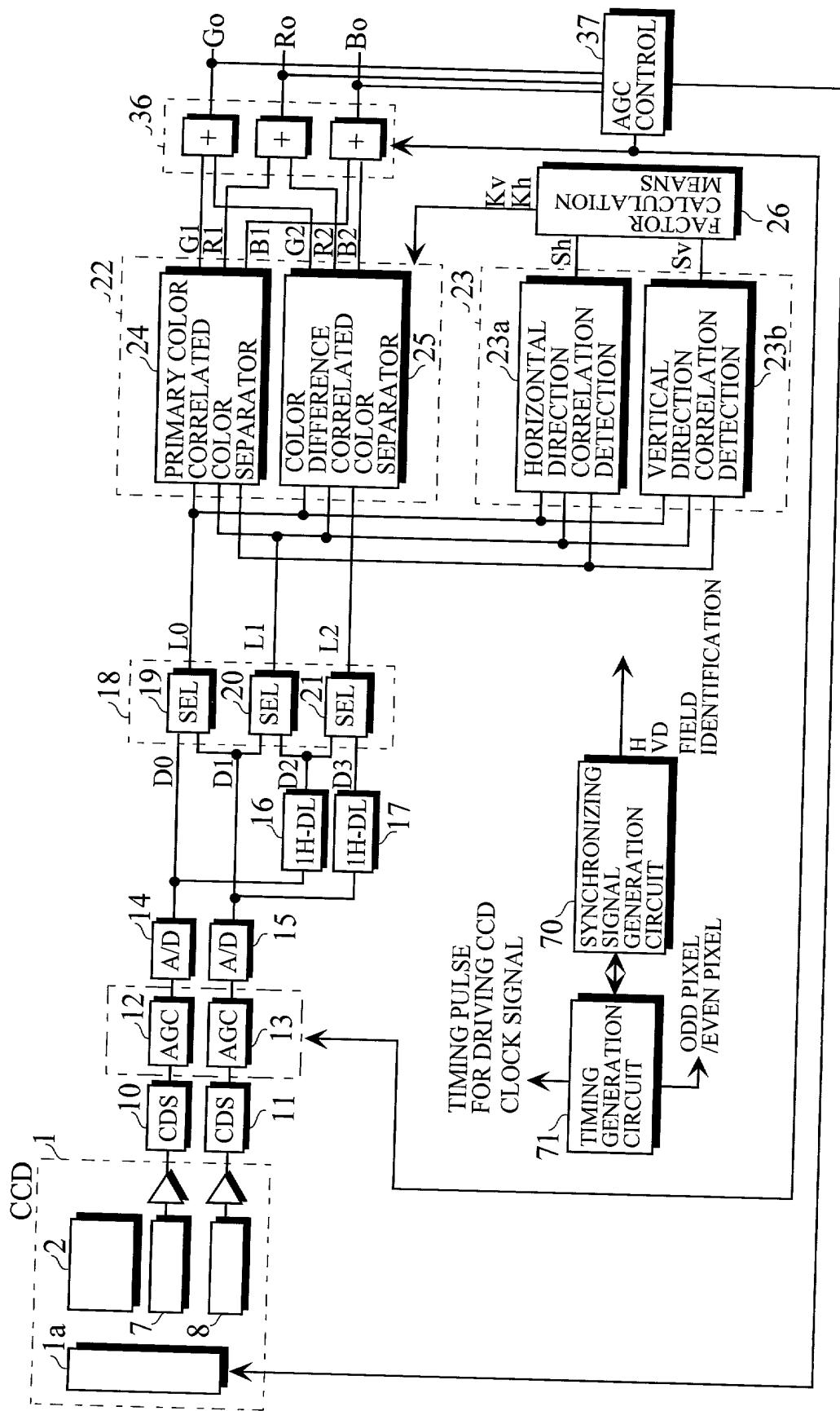


FIG. 15

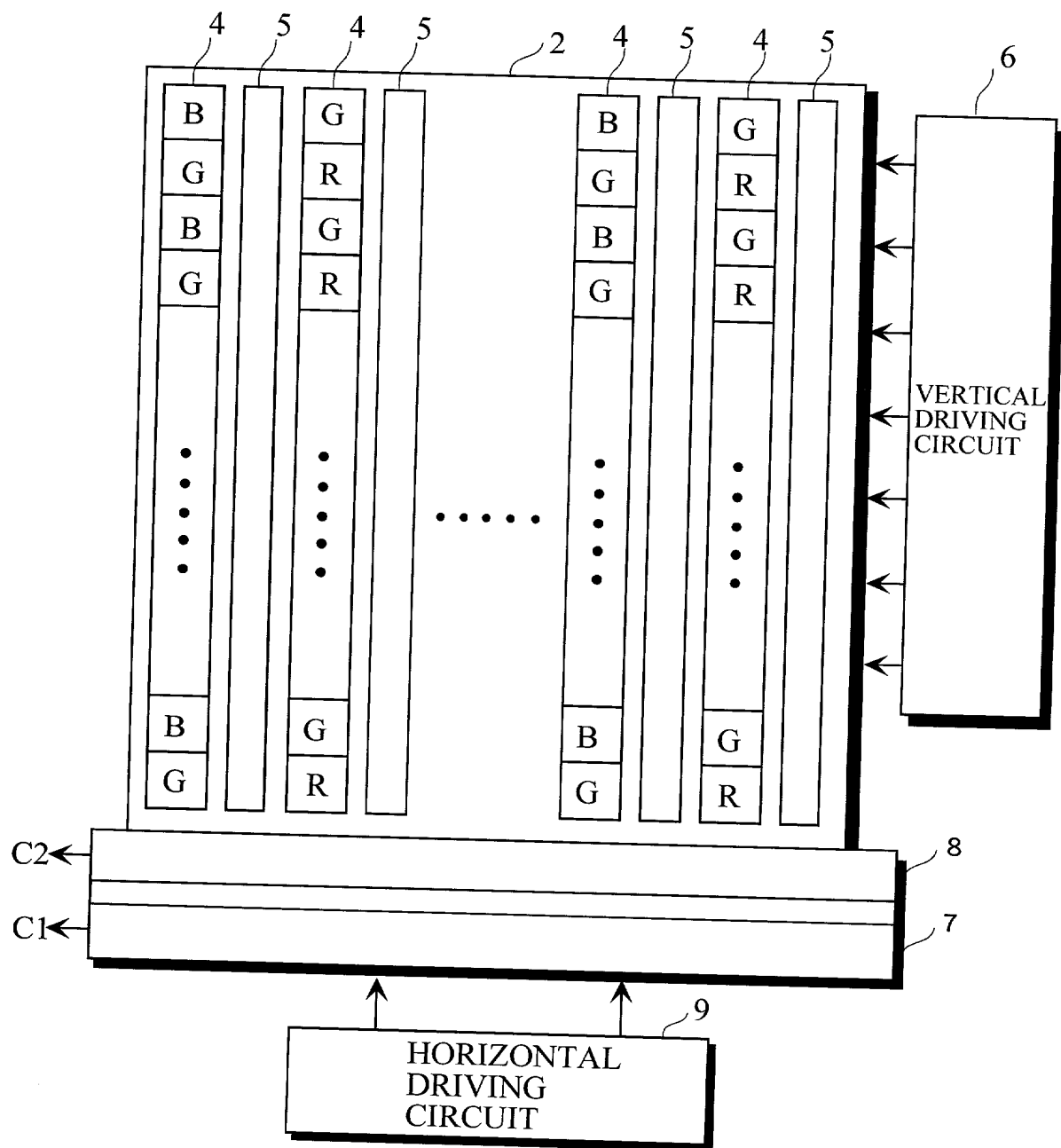


FIG. 16

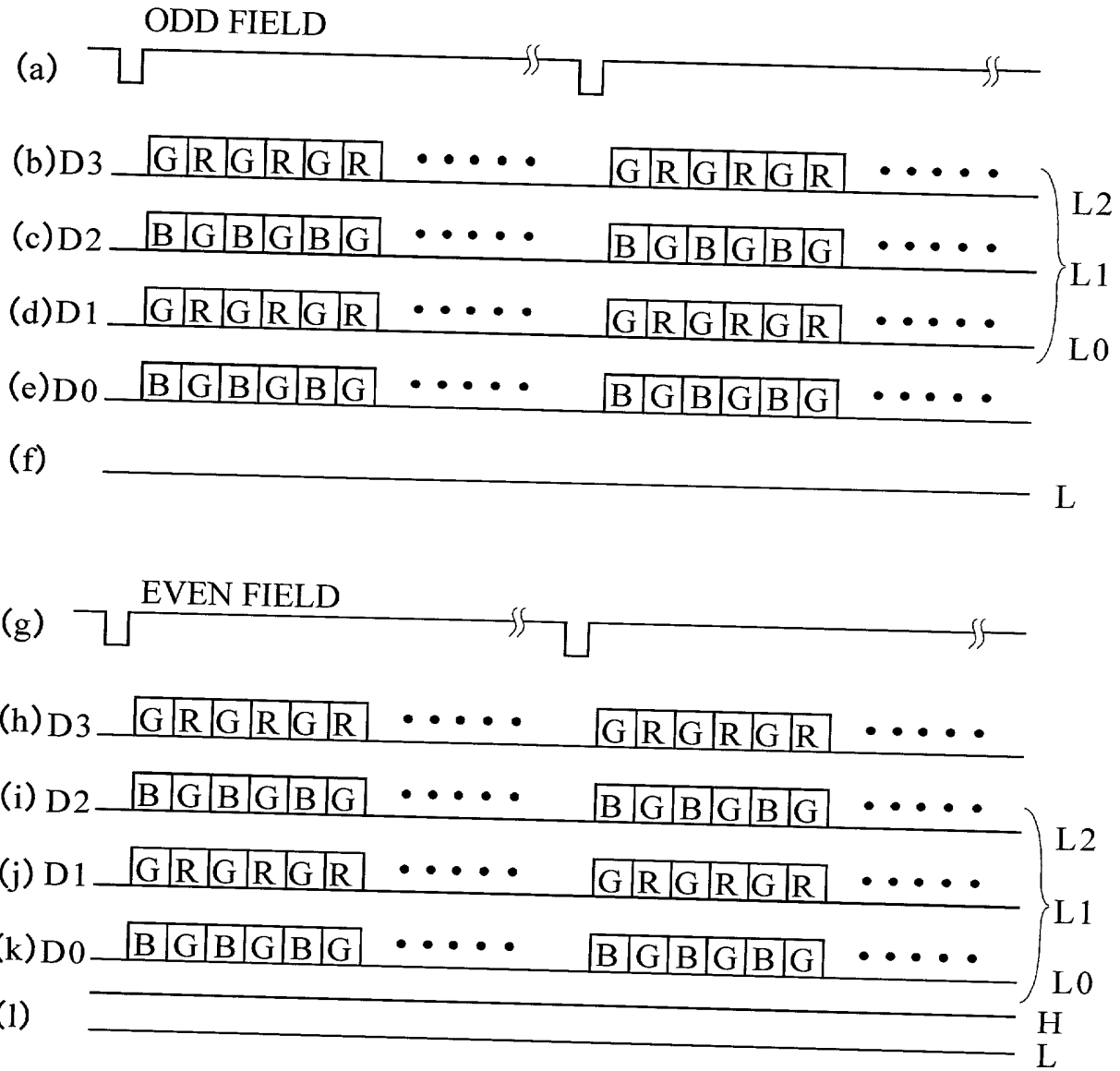


FIG. 17

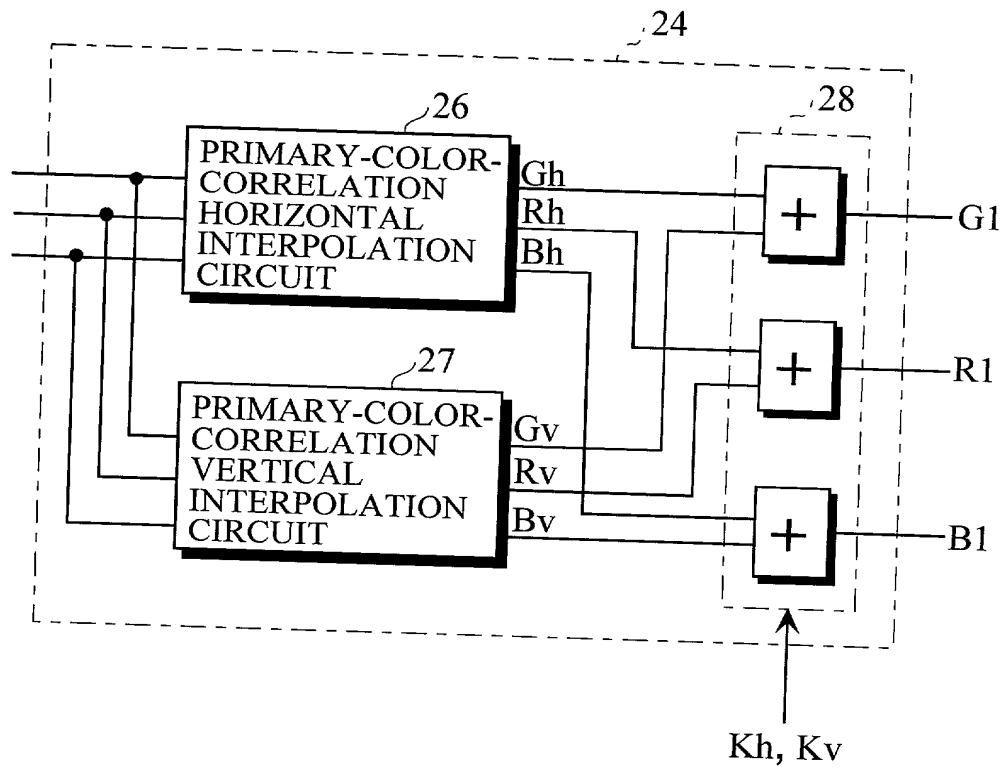


FIG. 18

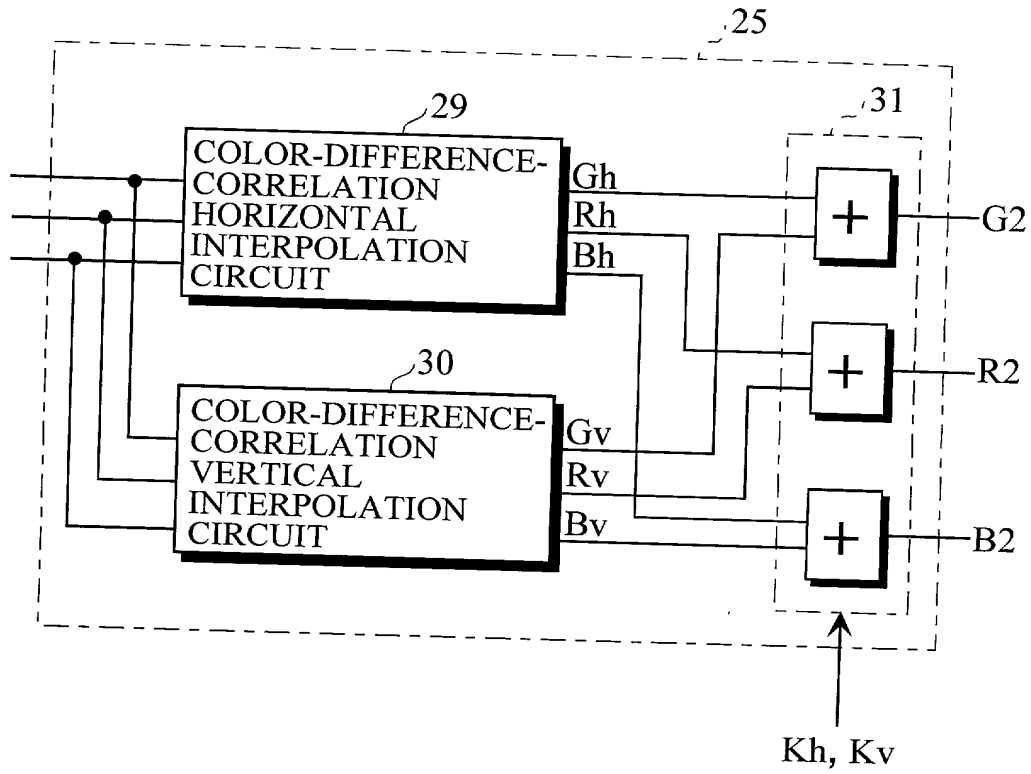


FIG. 19

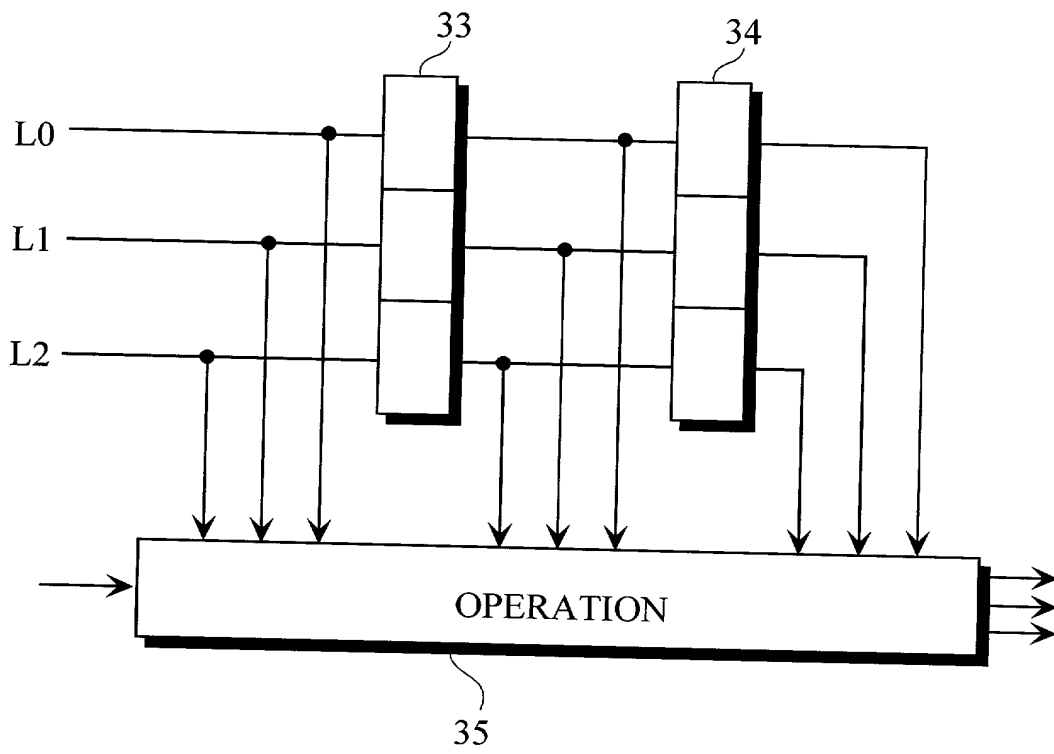


FIG. 20

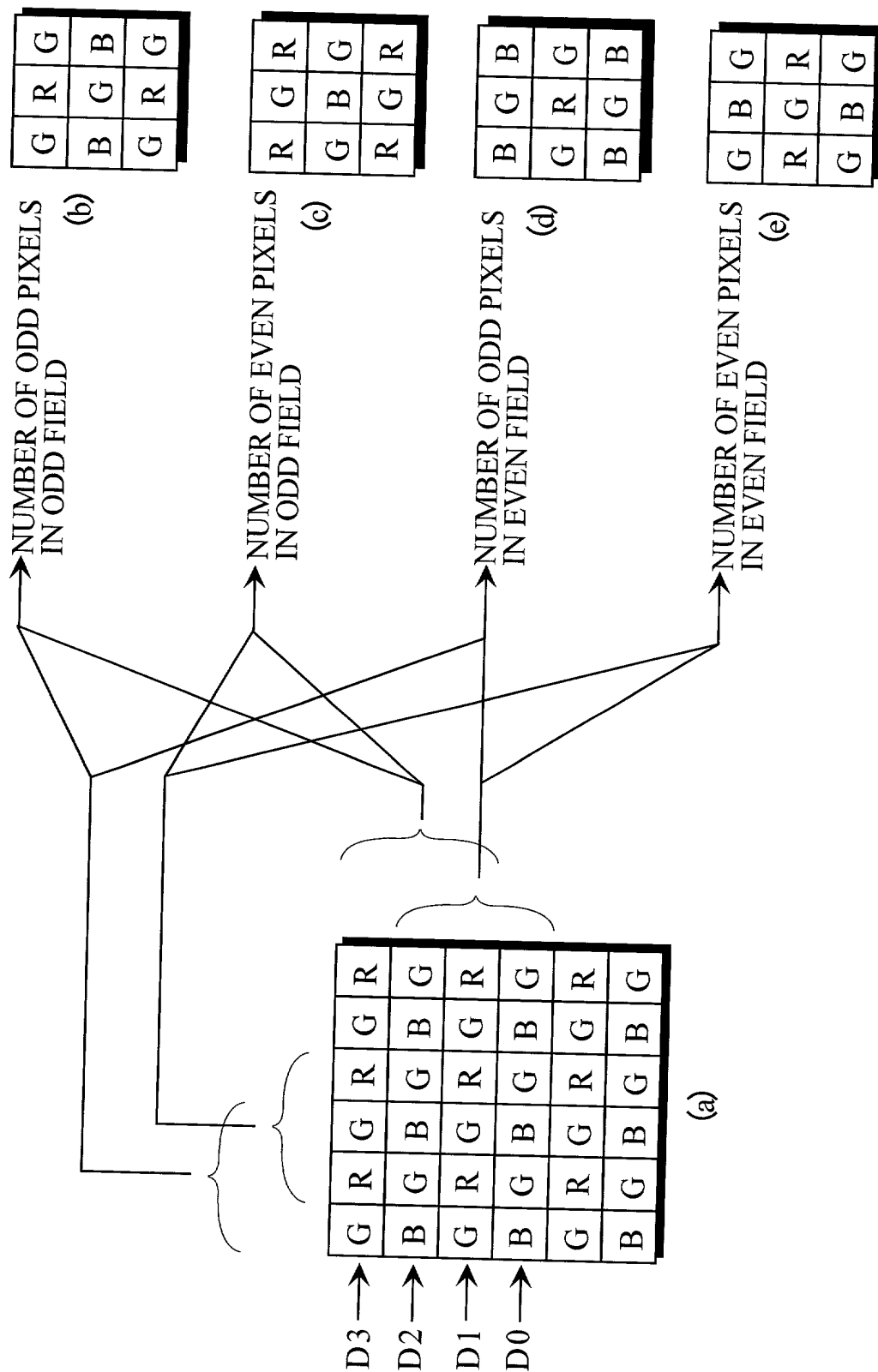


FIG. 21

| ODD FIELD | METHOD OF INTERPOLATING G, R, B SIGNAL | | | | | | | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|---|
| <p>ODD PIXEL</p> <table><tr><td>G11</td><td>R12</td><td>G13</td></tr><tr><td>B21</td><td>G22</td><td>B23</td></tr><tr><td>G31</td><td>R32</td><td>G33</td></tr></table> | G11 | R12 | G13 | B21 | G22 | B23 | G31 | R32 | G33 | $G_h = G_{22}$ $B_h = (B_{21} + B_{23})/2$ $R_h = \frac{G_{22} \times R_{12}}{G_{12}} = \frac{2(G_{22} \times R_{12})}{G_{11} + G_{13}}$ $G_v = G_{22}$ $R_v = (R_{12} + R_{32})/2$ $B_v = \frac{G_{22} \times B_{21}}{G_{21}} = \frac{2(G_{22} \times B_{21})}{G_{11} + G_{31}}$ |
| G11 | R12 | G13 | | | | | | | | |
| B21 | G22 | B23 | | | | | | | | |
| G31 | R32 | G33 | | | | | | | | |
| <p>EVEN PIXEL</p> <table><tr><td>R11</td><td>G12</td><td>R13</td></tr><tr><td>G21</td><td>B22</td><td>G23</td></tr><tr><td>R31</td><td>G32</td><td>R33</td></tr></table> | R11 | G12 | R13 | G21 | B22 | G23 | R31 | G32 | R33 | $B_h = B_{22}$ $G_h = (G_{21} + G_{23})/2$ $R_h = \frac{G_{22} \times R_{12}}{G_{12}} = \frac{(G_{21} + G_{23})(R_{11} + R_{13})}{4 \times G_{12}}$ $B_v = B_{22}$ $G_v = (G_{12} + G_{32})/2$ $R_v = \frac{R_{21} \times G_{22}}{G_{21}} = \frac{(R_{11} + R_{31})(G_{12} + G_{32})}{4 \times G_{21}}$ |
| R11 | G12 | R13 | | | | | | | | |
| G21 | B22 | G23 | | | | | | | | |
| R31 | G32 | R33 | | | | | | | | |

FIG. 22

| ODD FIELD | METHOD OF CALCULATING VERTICAL CORRELATED VALUE (Sv) AND HORIZONTAL CORRELATED VALUE (Sh) | | | | | | | | | |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|---|
| <p>ODD PIXEL</p> <table><tr><td>G11</td><td>R12</td><td>G13</td></tr><tr><td>B21</td><td>G22</td><td>B23</td></tr><tr><td>G31</td><td>R32</td><td>G33</td></tr></table> | G11 | R12 | G13 | B21 | G22 | B23 | G31 | R32 | G33 | $S_v = (G11 + G13) / 2 - (G31 + G33) / 2 $ $S_h = (G11 + G31) / 2 - (G13 + G33) / 2 $ |
| G11 | R12 | G13 | | | | | | | | |
| B21 | G22 | B23 | | | | | | | | |
| G31 | R32 | G33 | | | | | | | | |
| <p>EVEN PIXEL</p> <table><tr><td>R11</td><td>G12</td><td>R13</td></tr><tr><td>G21</td><td>B22</td><td>G23</td></tr><tr><td>R31</td><td>G32</td><td>R33</td></tr></table> | R11 | G12 | R13 | G21 | B22 | G23 | R31 | G32 | R33 | $S_v = G12 - G32 $ $S_h = G21 - G23 $ |
| R11 | G12 | R13 | | | | | | | | |
| G21 | B22 | G23 | | | | | | | | |
| R31 | G32 | R33 | | | | | | | | |

FIG. 23

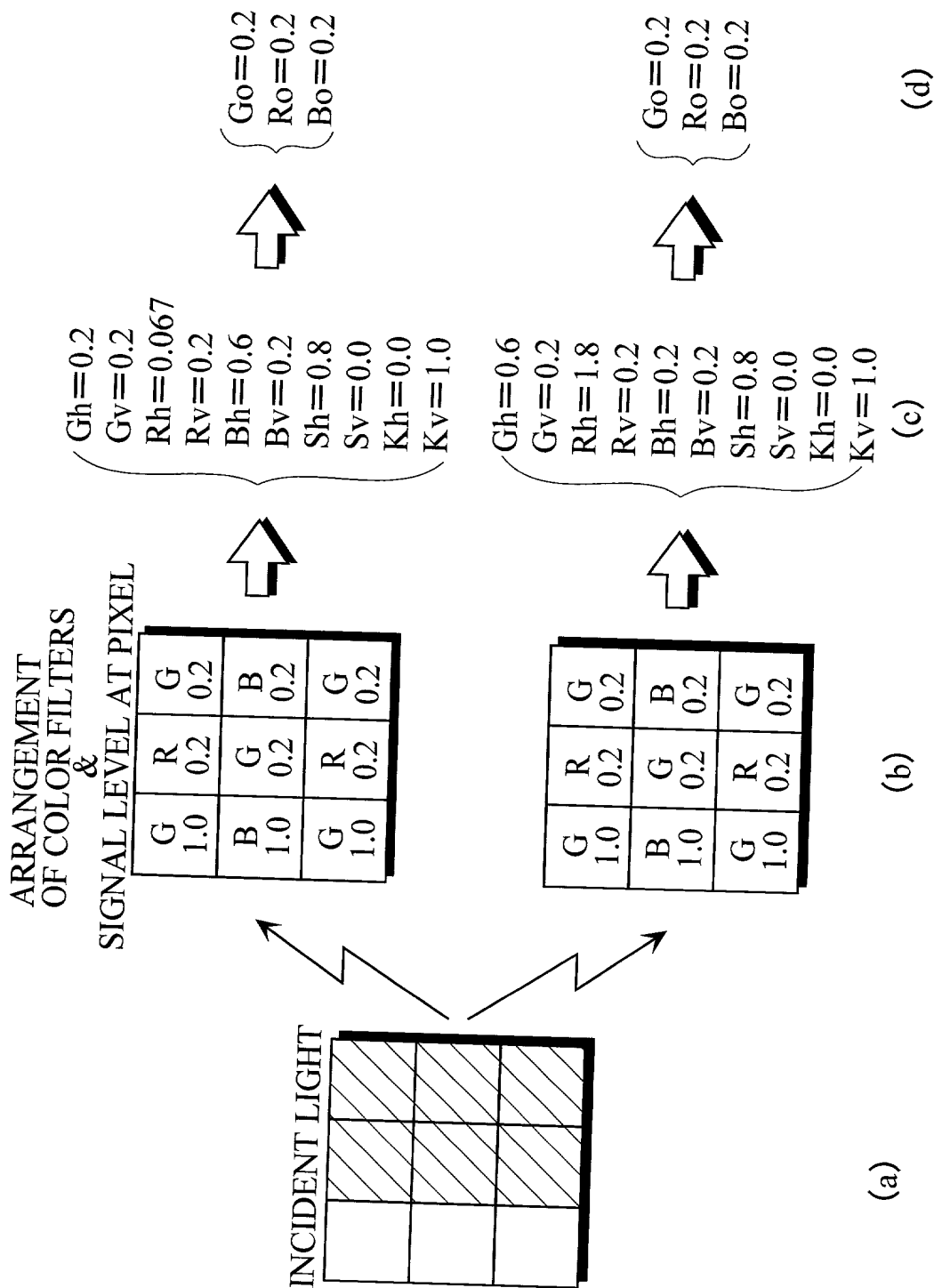


FIG. 24

| ODD FIELD | METHOD OF INTERPOLATING G, R, B SIGNAL | | | | | | | | | |
|--|--|-----|-----|-----|-----|-----|-----|-----|-----|---|
| <p>ODD PIXEL</p> <table><tr><td>G11</td><td>R12</td><td>G13</td></tr><tr><td>B21</td><td>G22</td><td>B23</td></tr><tr><td>G31</td><td>R32</td><td>G33</td></tr></table> | G11 | R12 | G13 | B21 | G22 | B23 | G31 | R32 | G33 | $G_h = G_{22}$ $R_h = \frac{R_{12} + R_{32}}{2} - \frac{G_{11} + G_{13} + G_{31} + G_{33}}{4} + G_{22}$ $B_h = \frac{B_{21} + B_{23}}{2}$ $G_v = G_{22}$ $R_v = \frac{R_{12} + R_{32}}{2}$ $B_v = \frac{B_{21} + B_{23}}{2} - \frac{G_{11} + G_{13} + G_{31} + G_{33}}{4} + G_{22}$ |
| G11 | R12 | G13 | | | | | | | | |
| B21 | G22 | B23 | | | | | | | | |
| G31 | R32 | G33 | | | | | | | | |
| <p>EVEN PIXEL</p> <table><tr><td>R11</td><td>G12</td><td>R13</td></tr><tr><td>G21</td><td>B22</td><td>G23</td></tr><tr><td>R31</td><td>G32</td><td>R33</td></tr></table> | R11 | G12 | R13 | G21 | B22 | G23 | R31 | G32 | R33 | $G_h = \frac{G_{21} + G_{23}}{2}$ $R_h = \frac{R_{11} + R_{13} + R_{31} + R_{33}}{4} - \frac{G_{12} + G_{32}}{2} + \frac{G_{21} + G_{23}}{2}$ $B_h = B_{22}$ $G_v = \frac{G_{12} + G_{32}}{2}$ $R_v = \frac{R_{11} + R_{13} + R_{31} + R_{33}}{4} + \frac{G_{12} + G_{32}}{2} - \frac{G_{21} + G_{23}}{2}$ $B_v = B_{22}$ |
| R11 | G12 | R13 | | | | | | | | |
| G21 | B22 | G23 | | | | | | | | |
| R31 | G32 | R33 | | | | | | | | |

FIG. 25

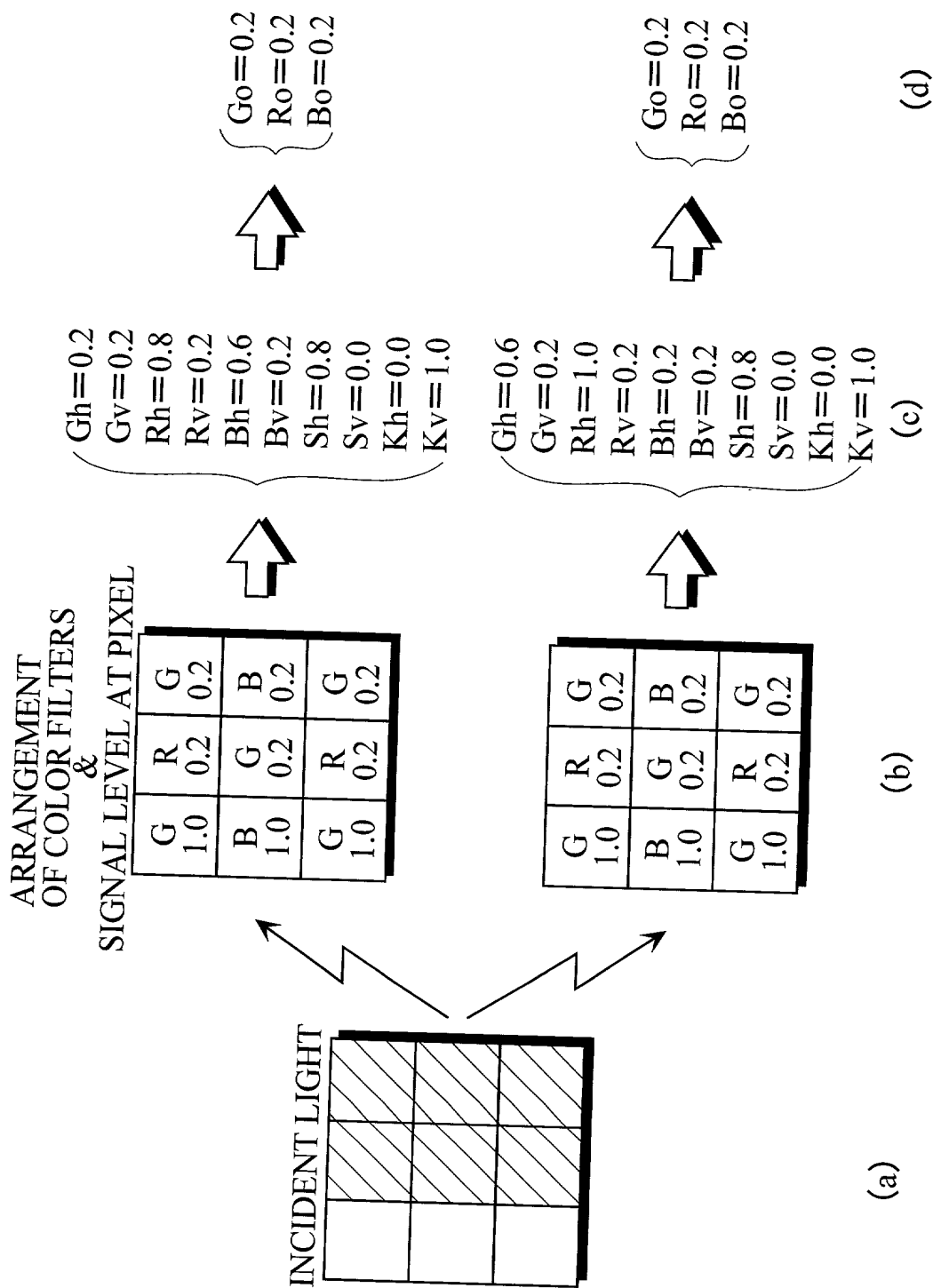


FIG. 26

| ODD FIELD | METHOD OF INTERPOLATING G,R,B SIGNAL | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| <div>ODD PIXEL</div> <table><tr><td>G11</td><td>B12</td><td>G13</td><td>B14</td><td>G15</td></tr><tr><td>R21</td><td>G22</td><td>R23</td><td>G24</td><td>R25</td></tr><tr><td>G31</td><td>B32</td><td>G33</td><td>B34</td><td>G35</td></tr><tr><td>R41</td><td>G42</td><td>R43</td><td>G44</td><td>R45</td></tr><tr><td>G51</td><td>B52</td><td>G53</td><td>B54</td><td>G55</td></tr></table> | G11 | B12 | G13 | B14 | G15 | R21 | G22 | R23 | G24 | R25 | G31 | B32 | G33 | B34 | G35 | R41 | G42 | R43 | G44 | R45 | G51 | B52 | G53 | B54 | G55 | <div>$G_h = G_{33}$</div> <div>$R_h = \frac{G_{33} \times (R_{21} + 6 \times R_{23} + R_{25})}{4 \times (G_{22} + G_{24})}$</div> <div>$B_h = \frac{4 \times (B_{32} + B_{34}) \times G_{33}}{G_{31} + 6 \times G_{33} + G_{35}}$</div> <div>$G_v = G_{33}$</div> <div>$R_v = \frac{4 \times (R_{23} + R_{43}) \times G_{33}}{G_{13} + 6 \times G_{33} + G_{53}}$</div> <div>$B_v = \frac{G_{33} \times (B_{12} + 6 \times B_{32} + B_{52})}{4 \times (G_{22} + G_{42})}$</div> |
| G11 | B12 | G13 | B14 | G15 | | | | | | | | | | | | | | | | | | | | | | |
| R21 | G22 | R23 | G24 | R25 | | | | | | | | | | | | | | | | | | | | | | |
| G31 | B32 | G33 | B34 | G35 | | | | | | | | | | | | | | | | | | | | | | |
| R41 | G42 | R43 | G44 | R45 | | | | | | | | | | | | | | | | | | | | | | |
| G51 | B52 | G53 | B54 | G55 | | | | | | | | | | | | | | | | | | | | | | |
| <div>EVEN PIXEL</div> <table><tr><td>B11</td><td>G12</td><td>B13</td><td>G14</td><td>B15</td></tr><tr><td>G21</td><td>R22</td><td>G23</td><td>R24</td><td>G25</td></tr><tr><td>B31</td><td>G32</td><td>B33</td><td>G34</td><td>B35</td></tr><tr><td>G41</td><td>R42</td><td>G43</td><td>R44</td><td>G45</td></tr><tr><td>B51</td><td>G52</td><td>B53</td><td>G54</td><td>B55</td></tr></table> | B11 | G12 | B13 | G14 | B15 | G21 | R22 | G23 | R24 | G25 | B31 | G32 | B33 | G34 | B35 | G41 | R42 | G43 | R44 | G45 | B51 | G52 | B53 | G54 | B55 | <div>$G_h = \frac{4 \times (G_{32} + G_{34}) \times B_{33}}{B_{31} + 6 \times B_{33} + B_{35}}$</div> <div>$R_h = \frac{4 \times (R_{22} + R_{24}) \times G_{35}}{G_{21} + 6 \times G_{23} + G_{25}}$</div> <div>$B_h = B_{33}$</div> <div>$G_v = \frac{4 \times (G_{23} + G_{43}) \times B_{33}}{B_{13} + 6 \times B_{33} + B_{53}}$</div> <div>$R_v = \frac{4 \times (R_{22} + R_{42}) \times G_{33}}{G_{12} + 6 \times G_{32} + G_{52}}$</div> <div>$B_v = B_{33}$</div> |
| B11 | G12 | B13 | G14 | B15 | | | | | | | | | | | | | | | | | | | | | | |
| G21 | R22 | G23 | R24 | G25 | | | | | | | | | | | | | | | | | | | | | | |
| B31 | G32 | B33 | G34 | B35 | | | | | | | | | | | | | | | | | | | | | | |
| G41 | R42 | G43 | R44 | G45 | | | | | | | | | | | | | | | | | | | | | | |
| B51 | G52 | B53 | G54 | B55 | | | | | | | | | | | | | | | | | | | | | | |

FIG. 27

| ODD FIELD | | | | | METHOD OF INTERPOLATING G,R,B SIGNAL |
|-----------|-----|-----|-----|-----|---|
| ODD PIXEL | | | | | |
| G11 | B12 | G13 | B14 | G15 | Gh=G33 |
| R21 | G22 | R23 | G24 | R25 | Rh= $\frac{R21-2\times R23+R25}{8}-\frac{G22+G24}{2}+G33$ |
| G31 | B32 | G33 | B34 | G35 | Bh= $\frac{B32+B34}{2}-\frac{G31-2\times G33+G35}{8}$ |
| R41 | G42 | R43 | G44 | R45 | Gv=G33 |
| G51 | B52 | G53 | B54 | G55 | Rv= $\frac{R23+R43}{2}-\frac{G13-2\times G33+G53}{8}$ |
| | | | | | Bv= $\frac{B12-2\times B32+B52}{8}-\frac{G22+G42}{2}+G33$ |

| | | | | | |
|------------|-----|-----|-----|-----|---|
| EVEN PIXEL | | | | | |
| B11 | G12 | B13 | G14 | B15 | Gh= $\frac{G32+G34}{2}-\frac{B31-2\times B33+G35}{8}$ |
| G21 | R22 | G23 | R24 | G25 | Rh= $\frac{R22+R24}{2}-\frac{G21+6\times G23+G25}{8}+\frac{G32+G34}{2}-\frac{B31-2\times B33+B35}{8}$ |
| B31 | G32 | B33 | G34 | B35 | Bh=B33 |
| G41 | R42 | G43 | R44 | G45 | Gv= $\frac{G23+G43}{2}-\frac{B13-2\times B33+B53}{8}$ |
| B51 | G52 | B53 | G54 | B55 | Rv= $\frac{R22+R42}{2}-\frac{G12+6\times G32+G52}{8}+\frac{G23+G43}{2}-\frac{B13-2\times B33+B53}{8}$ |
| | | | | | Bv=B33 |

FIG. 28

| ODD FIELD | | METHOD OF INTERPOLATING G,R,B SIGNAL | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| ODD PIXEL | | $G_h = G_{33}$ $R_h = \frac{G_{33} \times (R_{21} + 6 \times R_{23} + R_{25})}{4 \times (G_{22} + G_{24})}$ $B_h = \frac{B_{32} + B_{34}}{2} - \frac{G_{31} - 2 \times G_{33} + G_{35}}{8}$ $G_v = G_{33}$ $R_v = \frac{R_{23} + R_{43}}{2} - \frac{G_{13} - 2 \times G_{33} + G_{53}}{8}$ $B_v = \frac{G_{33} \times (B_{12} + 6 \times B_{32} + B_{52})}{4 \times (G_{22} + G_{42})}$ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><td>G11</td><td>B12</td><td>G13</td><td>B14</td><td>G15</td></tr><tr><td>R21</td><td>G22</td><td>R23</td><td>G24</td><td>R25</td></tr><tr><td>G31</td><td>B32</td><td>G33</td><td>B34</td><td>G35</td></tr><tr><td>R41</td><td>G42</td><td>R43</td><td>G44</td><td>R45</td></tr><tr><td>G51</td><td>B52</td><td>G53</td><td>B54</td><td>G55</td></tr></table> | | G11 | B12 | G13 | B14 | G15 | R21 | G22 | R23 | G24 | R25 | G31 | B32 | G33 | B34 | G35 | R41 | G42 | R43 | G44 | R45 | G51 | B52 | G53 | B54 | G55 | | |
| G11 | B12 | G13 | B14 | G15 | | | | | | | | | | | | | | | | | | | | | | | | |
| R21 | G22 | R23 | G24 | R25 | | | | | | | | | | | | | | | | | | | | | | | | |
| G31 | B32 | G33 | B34 | G35 | | | | | | | | | | | | | | | | | | | | | | | | |
| R41 | G42 | R43 | G44 | R45 | | | | | | | | | | | | | | | | | | | | | | | | |
| G51 | B52 | G53 | B54 | G55 | | | | | | | | | | | | | | | | | | | | | | | | |
| EVEN PIXEL | | $G_h = \frac{G_{32} + G_{34}}{2} - \frac{B_{31} - 2 \times B_{33} + B_{35}}{8}$ $R_h = \frac{4 \times (R_{22} + R_{24})}{(G_{21} + 6 \times G_{23} + G_{25})} \times \left(\frac{G_{32} + G_{34}}{2} - \frac{B_{31} - 2 \times B_{33} + B_{35}}{8} \right)$ $B_h = B_{33}$ $G_v = \frac{G_{23} + G_{43}}{2} - \frac{B_{13} - 2 \times B_{33} + B_{53}}{8}$ $R_v = \frac{2 \times (R_{22} + R_{42})}{(G_{12} + 6 \times G_{32} + G_{52})} \times \left(G_{23} + G_{43} - \frac{B_{13} - 2 \times B_{33} + B_{53}}{4} \right)$ $B_v = B_{33}$ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><td>B11</td><td>G12</td><td>B13</td><td>G14</td><td>B15</td></tr><tr><td>G21</td><td>R22</td><td>G23</td><td>R24</td><td>G25</td></tr><tr><td>B31</td><td>G32</td><td>B33</td><td>G34</td><td>B35</td></tr><tr><td>G41</td><td>R42</td><td>G43</td><td>R44</td><td>G45</td></tr><tr><td>B51</td><td>G52</td><td>B53</td><td>G54</td><td>B55</td></tr></table> | | B11 | G12 | B13 | G14 | B15 | G21 | R22 | G23 | R24 | G25 | B31 | G32 | B33 | G34 | B35 | G41 | R42 | G43 | R44 | G45 | B51 | G52 | B53 | G54 | B55 | | |
| B11 | G12 | B13 | G14 | B15 | | | | | | | | | | | | | | | | | | | | | | | | |
| G21 | R22 | G23 | R24 | G25 | | | | | | | | | | | | | | | | | | | | | | | | |
| B31 | G32 | B33 | G34 | B35 | | | | | | | | | | | | | | | | | | | | | | | | |
| G41 | R42 | G43 | R44 | G45 | | | | | | | | | | | | | | | | | | | | | | | | |
| B51 | G52 | B53 | G54 | B55 | | | | | | | | | | | | | | | | | | | | | | | | |

FIG. 29

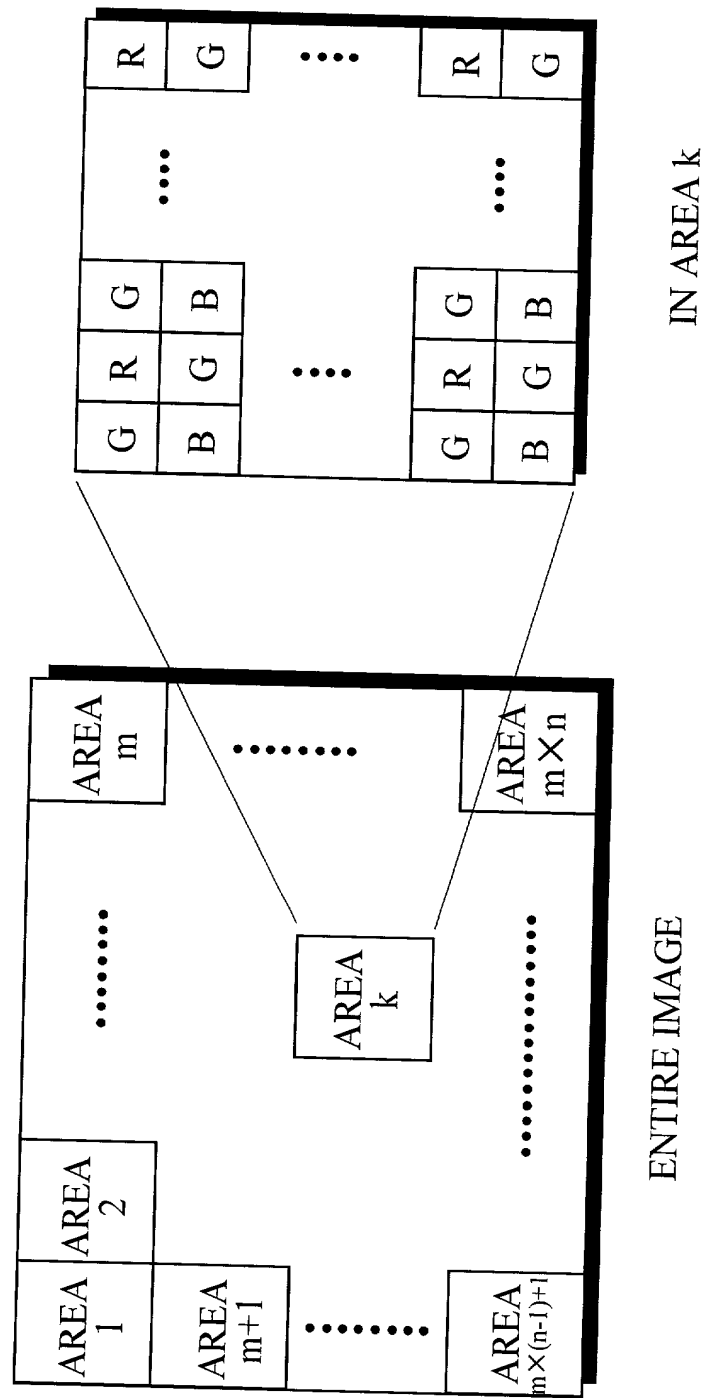


FIG. 30

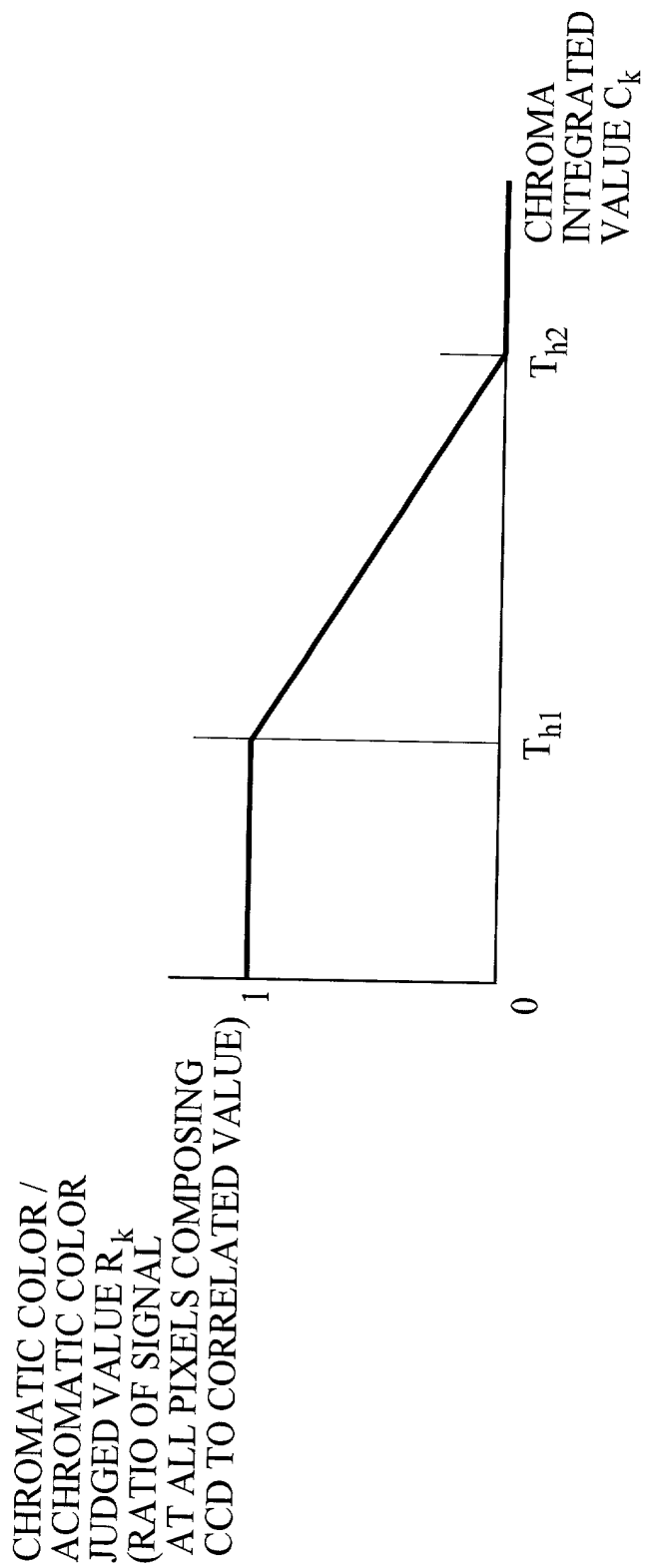


FIG. 31

